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Polymeric Nanocomposites

Theory and Practice

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Vorwort

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Preface

Nanostructured multi-phase polymers have generated great interest with promise to produce a new generation of materials displaying enhanced physical, mechanical, thermal, electrical, magnetic, and optical properties. The key to the success of nanocomposites hinges on the ability to exploit the potential of nano-structuring in the final product. Therefore, it is important to develop practical and economical formulations and processing methods for tailoring a sustainable material configuration at the nanoscale level. Recently, much progress has been made in meeting this challenge and in developing a wide range of commercial processes, products, and devices as a result of the research efforts and advances by many scientists, engineers, and technologists. While a large number of scientific papers and some books on polymer nanocomposites have been published, there is a clear need to bring together the scientific knowledge and the engineering developments relating to these materials in terms of synthesis, characterisation, production, and application. This book deals with clay-based polymer nanocomposites, which have been the subject of extensive research in the last decade. Besides its low cost, clay has a plate-like geometry, which could impart excellent product properties under optimum nanostructuring conditions.

The book provides an overview of the compositionprocessingproductapplication relationships in the field of polymer nanocomposites. It deals with the fundamental principles that govern the synthesis and behavior of polymer/clay nanocomposites, such as thermodynamics, kinetics, rheology, and morphology. Other chapters cover practical aspects, such as processing, performance, and some commercial applications of polymer/clay nanocomposites in selected industries, such as packaging, automotive, electronic, and telecommunications. It is hoped that the book will serve as a reference and guide for those who work in various aspects of the nanocomposite industry and technology or wish to learn about these promising new materials.

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